

# European Union Methane Action Plan



## Introduction

As part of its commitment to the Global Methane Pledge, the European Union submits this Methane Action Plan, which gives an outline of existing policies as well as further activities under development foreseen to reduce methane (CH<sub>4</sub>) emissions until 2030 and beyond.

The EU commitment to the Global Methane Pledge rests on a long-term policy goal to reduce greenhouse gas emissions towards climate neutrality by 2050, which will require further deep CH<sub>4</sub> emission reductions<sup>1</sup> building on a solid abatement record over the last decades. The EU has managed to consistently reduce CH<sub>4</sub> emissions since 1990, achieving a 36% reduction by 2020. Future goals are anchored in the **European Green Deal**,<sup>2</sup> which aims to address our interrelated environmental crisis (climate change, pollution and biodiversity loss, all driven by natural resources depletion) in a systemic and coherent manner.

Methane is not only a powerful short-lived climate forcer, but also a precursor of ozone, an air pollutant. Tackling methane emissions is therefore at the core of the European Green Deal's objectives. Turning policy goals into legislation, the **European Climate Law**<sup>3</sup> increased the EU's overall climate ambition for 2030 to at least -55% net greenhouse gas reduction compared with 1990, a step up from the previous ambition level to reduce greenhouse gas emissions by 40% by 2030. Increased ambition requires updates of existing policies as well as new initiatives. This process is ongoing, with the European Commission having proposed a comprehensive set of mutually reinforcing measures and initiatives including in the fields of agriculture, energy and waste. The European Commission has also adopted a specific **EU methane strategy** setting out a comprehensive set of measures to cut methane emissions.<sup>4</sup> Combined, these proposals aim at upscaling the EU's climate ambition, improve the EU's energy security and protect the EU's natural capital, the health and well-being of its citizens.

The measures currently implemented and proposed are expected to increase the yearly reduction rate of CH<sub>4</sub> emissions over the coming years and will reduce overall CH<sub>4</sub> emissions estimated by about 23% between 2020 and 2030 leading to an overall CH<sub>4</sub> reduction of just over 50% between 1990 and 2030. Important to note in this context is the sectoral split, with a majority of EU CH<sub>4</sub> emissions stemming from the agriculture sector where such emissions are harder to abate, but with emissions in the energy and waste sectors reducing significantly more than 30% in this period.

This Action Plan describes in Section 1 past trends in CH<sub>4</sub> emissions in the EU. In Section 2 it describes in more detail the existing set of EU policies that have contributed to this reduction as well as the ongoing review of these policies and additional new policies to achieve even higher CH<sub>4</sub> emission reductions. Section 3 describes the impact of increased climate ambition, which is also expected to further decrease CH<sub>4</sub> emissions. Finally, Section 4 describes how the EU intends to Monitor and Report on its progress on reducing CH<sub>4</sub> emissions, as well as on the policies and measures that directly impact sectoral CH<sub>4</sub> emissions.

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<sup>1</sup> The climate neutrality target by 2050 will require to reduce all greenhouse gas emissions as much as possible and balance any remaining emissions with removals. It is thus of particular importance that also CH<sub>4</sub> emissions are reduced as much as possible.

<sup>2</sup> COM(2019) 640 final, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFINcv>

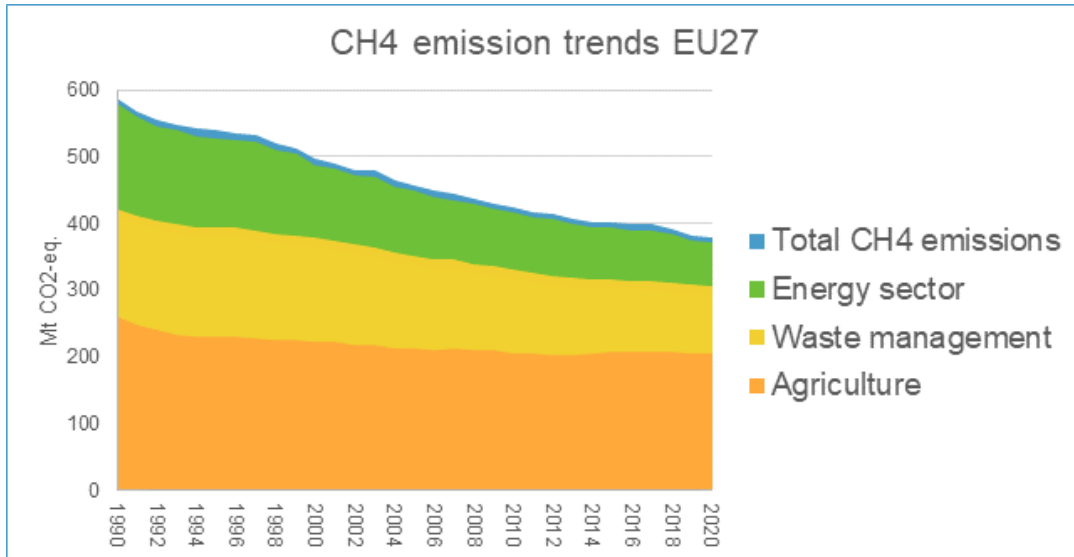
<sup>3</sup> Regulation (EU) 2021/1119 at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R1119>

<sup>4</sup> COM(2022)663 final, at: [EUR-Lex - 52020DC0663 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A663%3AFINcv)

## EU methane emissions sources and historic trends

All data presented in this section stems from the EU greenhouse gas inventories as submitted to the UNFCCC by the EU and its Member States and as reported in the EEA data viewer<sup>5</sup>. EU-27 methane emissions dropped from 589 Mt CO<sub>2</sub>eq in 1990 to 379 Mt CO<sub>2</sub>eq in 2020, a reduction of 36%. Almost all of these emissions occur in three sectors: namely, agriculture, waste management and energy – with 54%, 27% and 17% shares of total net methane emissions in 2020.

Figure 1: CH<sub>4</sub> emission trends EU 27

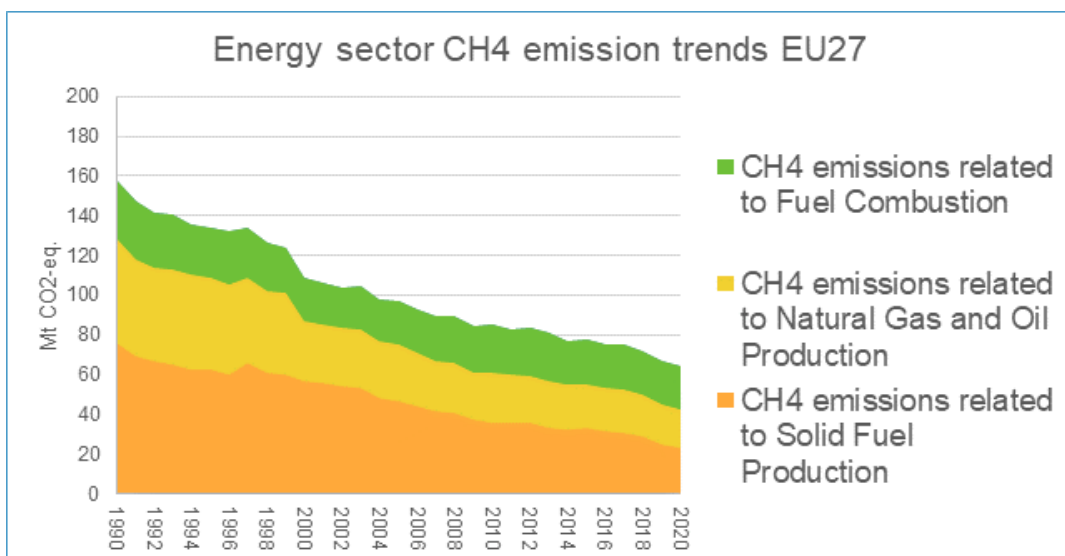


Source: EEA greenhouse gases – data viewer

The largest source of CH<sub>4</sub> emissions in the EU is from the agriculture sector. With 206 Mt CO<sub>2</sub>eq emissions in 2020 it represented 54% of the EU's CH<sub>4</sub> emissions. The smallest sector has become the energy sector, with 64 Mt CO<sub>2</sub>eq in 2020 representing only 17% of CH<sub>4</sub> emissions. Remaining emissions come mainly from the waste management sector, with 101 Mt CO<sub>2</sub>eq in 2020 representing 27% of CH<sub>4</sub> emissions.

Significant differences exist between sectors, underlining differences in mitigation potential, costs and structural change.

Figure 2: CH<sub>4</sub> emission trends in the EU energy sector

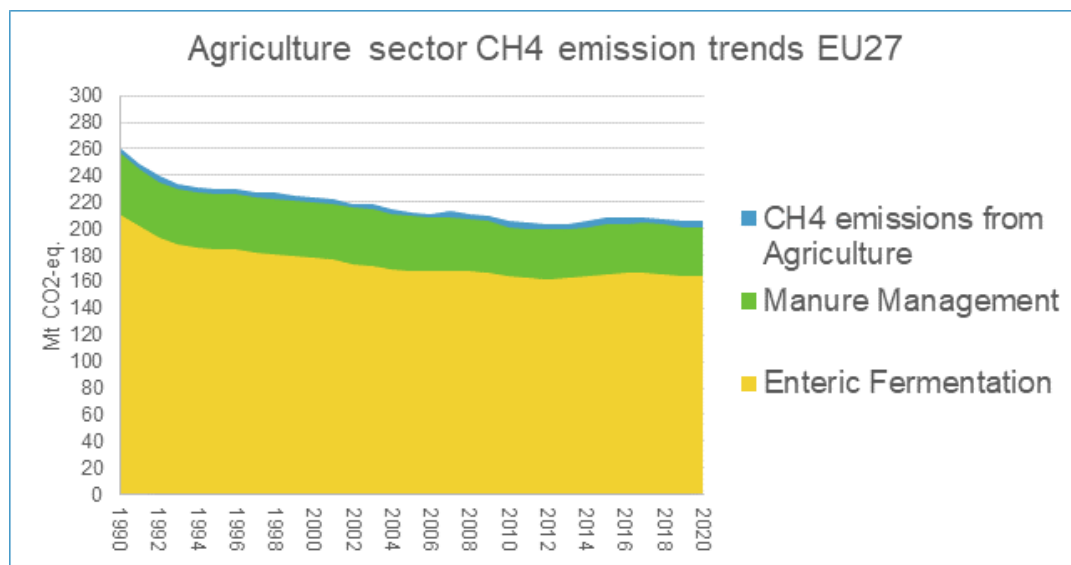


<sup>5</sup> EEA greenhouse gases data viewer, CH<sub>4</sub> emissions expressed in CO<sub>2</sub>-equivalent applying the GWP of the IPCC's Fourth Assessment Report, at: <https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>

In the **energy sector** (IPCC sector 1), CH<sub>4</sub> emissions declined most, by 60% from 158 Mt CO<sub>2</sub>eq in 1990 to 64 Mt CO<sub>2</sub>eq in 2020. The bulk of the reduction comes from the mitigation of fugitive emissions from fuels (from 129 Mt CO<sub>2</sub>eq in 1990 to 43 Mt CO<sub>2</sub>eq in 2020), which covers emissions from the extraction of solid fuels as well as emissions associated with the oil and natural gas production and distribution. Notably, here is the strong reduction already seen in CH<sub>4</sub> emissions stemming from coal and lignite extraction, and its related emissions, which have been reduced by almost 70% in the EU since 1990.

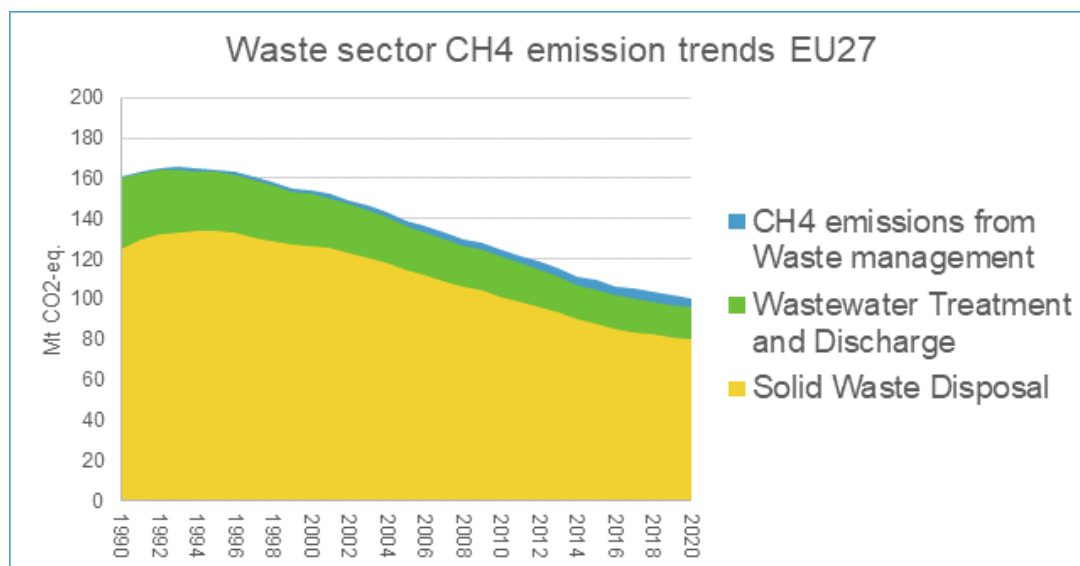
To a lesser extent, CH<sub>4</sub> emissions associated with fuel combustion itself reduced (from 29 Mt CO<sub>2</sub>eq in 1990 to 21 Mt CO<sub>2</sub>eq in 2020), mostly in the residential sector. Again, this was associated with a shift in type of fossil fuels combusted.

Figure 3: CH<sub>4</sub> emission trends in the EU agriculture sector



In the **agricultural sector** (IPCC sector 3), CH<sub>4</sub> emissions decreased from 261 Mt CO<sub>2</sub>eq in 1990 to 206 Mt CO<sub>2</sub>eq in 2010 and remained at that level in 2020, which means a reduction of 21%. Almost all agricultural methane emissions are from livestock: 80% of the total stems from enteric fermentation and 18% from manure management. Methane emissions from rice cultivation and other sources play a very marginal role in the EU. In terms of agricultural sub-sectors, methane from enteric fermentation comes mostly from cattle (141 Mt CO<sub>2</sub>eq), whereas methane from manure management mainly and almost equally originates from cattle and swine (17 Mt CO<sub>2</sub>eq each). From 1990 to 2010, reductions happened in both sub-sectors (-22% and -18% respectively) but remained essentially stable from 2010 to 2020. Whereas animal output increased by 11% compared to 2005, CH<sub>4</sub> emissions decreased by 4%. Therefore, one should consider that the decoupling of emissions from aggregate animal output in volume terms is ongoing in the EU. The CH<sub>4</sub> intensity of EU-27 animal output steadily decreased (-13%) from 2005 to 2020 and remains one of the lowest worldwide.

Figure 3: CH<sub>4</sub> emission trends in the EU waste sector



In the **waste management sector** (IPCC sector 5), CH<sub>4</sub> emissions dropped from 160 Mt CO<sub>2</sub>eq in 1990 to 101 Mt CO<sub>2</sub>eq in 2020, or a reduction of 37%. The vast majority of methane emissions in 2020 emerged in solid waste (managed or unmanaged) landfills (80%). This concerns mostly managed waste disposal sites (68 Mt CO<sub>2</sub>eq) and to a lesser extent unmanaged sites (11 Mt CO<sub>2</sub>eq). The former have seen specific reductions with the introduction and implementation of EU waste legislation. With regard to wastewater treatment and discharge, two thirds of methane emissions occur in domestic wastewater (11 Mt CO<sub>2</sub>eq), whereas the other third occurs in industrial wastewater (5 Mt CO<sub>2</sub>eq)<sup>6</sup>.

### EU methane mitigation policies and measures

The EU has set itself a long-term target to become climate neutral by 2050 covering all greenhouse gases as regulated under the UNFCCC. This objective is enshrined in the European Climate Law<sup>7</sup>. The objective requires that all sectors in the EU reduce their GHG emissions by 2050, and any remaining GHG emissions will have to be compensated by removals. The Climate Law thus includes CH<sub>4</sub> emissions, and it is of the utmost importance to reduce these emissions strongly, in order to require fewer compensating removals.

The **European Climate Law** sets up a framework to ensure sufficient progress towards the climate neutrality objective and also includes a strengthening of the 2030 greenhouse gas reduction ambition, to achieve a domestic reduction of net greenhouse gas emissions by at least 55 % compared to 1990 levels. An ambition level that was also incorporated in the update of the EU's Nationally Determined Contribution to the UNFCCC<sup>8</sup>. This is a significant step up of the previous climate ambition, which foresaw to reduce greenhouse gas emissions by at least 40% by 2030.

EU climate policy covers all greenhouse gas emissions and removals in the EU. Three different pieces of legislation (the EU Emissions Trading System, the Effort Sharing Regulation and the Land Use, Land Use Change and Forestry Regulation) cover different sectors and greenhouse gases and set specific greenhouse gas reduction targets for each.

The **EU Emissions Trading System (EU ETS)**<sup>9</sup> regulates presently mainly CO<sub>2</sub> emissions of large point sources in industry and the power sector, as well as emissions in the aviation sector<sup>10</sup>. The EU ETS is presently under

<sup>6</sup> The blue bar in Figure 3 refers mostly to CH<sub>4</sub> emissions coming from the biological treatment of solid waste (i.e. waste composting as well as anaerobic digestion at biogas facilities)

<sup>7</sup> Regulation (EU) 2021/1119, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R1119>

<sup>8</sup> [EU\\_NDC\\_Submission\\_December\\_2020.pdf \(unfccc.int\)](https://unfccc.int/ndc-submission-december-2020.pdf)

<sup>9</sup> See: [https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets\\_en](https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en)

<sup>10</sup> [Consolidated TEXT: 32003L0087 — EN — 08.04.2018 \(europa.eu\)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32003L0087)

review, with a Commission proposal being discussed to increase its ambition and expand its applications to new sectors. At this stage, it is not foreseen that it will regulate CH<sub>4</sub> emissions<sup>11</sup> up to 2030.

CH<sub>4</sub> emissions are covered by the other two pieces of climate legislation:

The **Land Use, Land Use Change and Forestry Regulation (LULUCF)**<sup>12</sup> regulates all emissions and removals of the Land Use, Land Use Change and Forestry sector, which in the EU corresponds to an overall net removal. This includes next to CO<sub>2</sub> emissions and removals also the related CH<sub>4</sub> and N<sub>2</sub>O emissions. It defines at Member State level target trajectories of net removals that Member States need to meet. The current Regulation foresees that Member States need to maintain the net removals in the sector at a level that would correspond to existing land use practices. The proposed update of the Regulation<sup>13</sup>, would require them to actively increase the EU's net removals by increasing removals and/or decreasing emissions. Overall, this is expected to have a limited impact on absolute CH<sub>4</sub> emissions in the EU.<sup>14</sup>

The **Effort Sharing Regulation**<sup>15</sup> covers all greenhouse gas emissions not covered by the existing EU ETS or the Land Use, Land Use Change and Forestry Regulation. It thus covers almost all CH<sub>4</sub> emissions in the EU, as well as all other non-CO<sub>2</sub> emissions. Emitting sources are sectors such as road transport, buildings heating, small industry, agriculture, waste management and refrigeration.

The Regulation sets annual national emission reduction targets from 2021 to 2030, becoming more ambitious every year. Member States are thus responsible for meeting these targets but have the flexibility to decide how to achieve the required mitigation across sectors and different greenhouse gases. This flexibility allows them to address Member States specific situations, while overall ensuring environmental integrity at the EU level.

The Effort Sharing Regulation is currently being reviewed to achieve higher climate ambition<sup>16</sup>, which in principle should ensure that it reduces overall emissions by 40% by 2030 compared to 2005 (as the sectors' contribution to the target of overall net greenhouse gas reductions of at least 55% compared to 1990), with some Member States having targets as high as a 50% reduction. Methane emissions represent on average 18% of the emissions covered by this Regulation in the EU. After CO<sub>2</sub> they are the biggest emission source, and as such Member States have a clear interest in reducing CH<sub>4</sub> emissions to achieve their national greenhouse gas reduction targets.

The actions undertaken by EU Member States to meet their national greenhouse gas reductions targets under the Effort Sharing Regulation, will in the end determine the exact reduction level for CH<sub>4</sub> emission reductions in the EU. The Effort Sharing Regulation as such does not include specific sectoral measures at EU level, but Member States are supported through a number of important EU sectoral policies that impact CH<sub>4</sub> emissions, notably in the agriculture, waste and the energy sectors. These policies have been recently reviewed or are in the process of being reviewed in order to contribute to the Green Deal objectives. In this context the European Commission also adopted an EU strategy to reduce methane emissions in October 2020 (the '**EU Methane Strategy**') setting out a comprehensive set of measures to cut methane emissions in the energy, agriculture and waste management sectors. These EU sectoral policies are described in more detail below, including their updates under preparation.

## Reducing CH<sub>4</sub> emissions in the agriculture sector

The sector with the largest remaining CH<sub>4</sub> emissions in the EU, the agriculture sector, is also the sector where achieving further reductions is the most challenging, due to the high costs and the nature of involved

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<sup>11</sup> Proposal to amend the EU ETS Directive (2021/0211 (COD)). This proposal foresees the expansion of the existing ETS to CO<sub>2</sub> emissions of the maritime sector as well as the creation of a second Emission Trading System that covers CO<sub>2</sub> emissions from small point sources under the road transport and buildings sectors.

<sup>12</sup> Regulation (EU) 2018/841, at: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2018.156.01.0001.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.156.01.0001.01.ENG)

<sup>13</sup> COM(2021) 554 final, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0554>

<sup>14</sup> The LULUCF sector's CH<sub>4</sub> emissions in 2020 only represented 7 million ton CO<sub>2</sub>-eq. emissions (with a historic range over 1990 and 2020 between 6 and 10 million ton CO<sub>2</sub>-eq. emissions).

<sup>15</sup> Regulation (EU) 2018/842, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018R0842>

<sup>16</sup> COM(2021) 554 final, at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52021PC0554>

biological processes. With more than half of all methane emissions in the EU, achieving further reductions in this sector, will be key.

The new Common Agricultural Policy (CAP) for the period 2023-2027 was adopted in December 2021 and will enter into force on 1 January 2023. In total, its budget provides EUR 387 billion of additional income, of which 40 % are dedicated to climate action. Under the new CAP, EU Member States have to prepare Strategic Plans in which they lay down how they implement the new CAP at national level. Member States have the legal obligation to clearly show greater ambition than at present with regards to care for the environment and climate. They have to show how their Strategic Plans will make a specific contribution to achieving the objectives of EU legislation, including those for climate mitigation and adaptation. A common set of impact and result indicators is proposed at the EU level to allow monitoring of policy implementation and an evaluation of policy impacts based on common indicators. These requirements and standards are much more ambitious than previous requirements, including the new eco-schemes which contribute fully to environment and climate objectives.

The CAP also foresees a significant budget for rural development of which Member States will have to spend at least 35 % on actions related to the environment, climate and animal welfare. Both, eco-schemes and rural development support can be directed to improved livestock and manure management and thus contribute to reductions in methane emissions.

Two strategies can be used that would allow CAP spending to contribute to reducing methane emissions. Firstly, increased productivity would allow for using fewer animals and fewer inputs to produce dairy and meat products. Secondly, innovative technologies and practices can be adopted that will aim to reduce methane emissions. Examples to reduce enteric fermentation include breeding, improving fertility and reproduction, feed management and feed additives. In the area of manure management anaerobic digestion is an important technology, which not only reduces methane emissions in the agriculture sector, but also increases availability of biogas and bio-methane, which can improve the EU's energy security.

Apart from the CAP, other methane-relevant policies also impact the agriculture sector:

A direct impact on CH<sub>4</sub> emissions from agriculture is expected from the proposed **revision of the Industrial Emissions Directive (IED)**<sup>17</sup>. This legislation addresses pollution from large installations, other than CO<sub>2</sub> emissions from installations covered by the EU Emission Trading System. It requires those installations to apply Best Available Techniques to minimise the environmental impact of their operations. An enhanced contribution to the reduction of greenhouse gas emissions from EU's largest agro-industrial installations is one of the central areas to the proposed revision, which is currently discussed between the co-legislators.

The Commission has proposed to include cattle as well as to lower the threshold for the size of pigs and poultry farms in the scope of the IED. The directive would cover livestock farms with a capacity of 150 livestock units or more which means that the largest 10% of cattle farms, 18% of pig farms and 15% of poultry farms will be covered compared to the current 4% for pigs and poultry farms respectively. By expanding the scope to include cattle farms, as well as smaller pigs and poultry farms, the fraction of methane emissions from livestock that will be regulated by the IED increases from around 3% to 43%. This includes emissions from enteric fermentation and manure management. There is therefore a high potential for the IED to contribute to methane emission reductions, as technologically feasible mitigation practices do exist. Methane emission reduction, through the implementation of Best Available Techniques (BAT), is estimated at 8% for cattle and 37% for pigs for the IED regulated farms. Although the phase-in of the new rules will take several years, the revision of the IED will guide long-term investments and innovation to mitigate methane from livestock.

The European Commission has also adopted a **Farm to Fork Strategy**<sup>18</sup>. This strategy aims to accelerate the transition to a sustainable food system, which has a neutral or positive impact on the environment, helps to mitigate climate change and biodiversity loss, and ensures food security and fair prices for producers and

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<sup>17</sup> COM (2022)156 final, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0156>

<sup>18</sup> COM(2020)381 final, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0381>

consumers. The strategy, which is closely linked to the Green Deal, formulates a series of concrete targets, the following of which will have a direct or indirect bearing on methane from agriculture:

- Reduction of nutrient losses by 50 % and reduction of fertiliser application by 20 % by 2030;
- At least 25 % of the EU's agricultural land under organic farming by 2030;
- Halving per capita food waste at retail and consumer levels by 2030.

Another driver recognised in the Farm to Fork Strategy for reductions in the environmental impact of agriculture in the EU can be the lifestyle choices of European citizens and consumers.<sup>19</sup>

## Reducing CH<sub>4</sub> emissions in the waste management sector

EU waste legislation and its implementation played a critical role for the above-mentioned methane emissions reductions in the waste management sector. In the waste sector, the main sources of methane emissions are primarily a continued landfilling of biodegradable waste resulting in a long-term methane formation in landfill bodies, and uncontrolled emissions of landfill gas in landfill sites and emissions related to the treatment of sewage sludge. EU policies have impacted both sources and emissions. The reduction of food waste<sup>20</sup> promoted by the Farm to Fork strategy will also reduce methane emissions, as less food waste will need to be treated or will be disposed in landfills.

The **Waste Framework Directive**,<sup>21</sup> which was initially adopted in 1975, and amended in 1991, 2006 and 2008,<sup>22</sup> establishes as the foundation of EU waste management the five-steps “waste hierarchy”: Waste prevention and re-use are the most preferred options, followed by recycling (including composting), then energy recovery, while waste disposal through landfills should be the very last resort.

The **Landfill Directive**, first adopted in 1999, requires landfill operators to manage landfill gas by either using it to generate energy or flaring it, directly reducing CH<sub>4</sub> emissions. It obliged the Member States to reduce the amount of biodegradable municipal waste landfilled to 35% of 1995 levels by 2016 (some Member States had a derogation until 2020). Member States had to establish and implement legislation and strategies leading to a treatment of the biodegradable waste that is diverted from landfill (e.g. by composting, biogas, biomechanical treatment or incineration).. This Directive was amended in 2018<sup>23</sup>, introducing a limit of municipal waste landfilled to 10% by 2035, as well as an obligation to collect biodegradable waste separately by 2024. In 2018, still 24% of all municipal waste generated in the EU was landfilled<sup>24</sup> and there remains to be a continued need to ensure appropriate implementation of legislation, including addressing illegal landfill sites, and investments in these sector. Overall, it is expected that methane emissions from landfills will decrease further. A new revision of the Landfill Directive is foreseen in 2024.

The **Urban Waste Water Treatment Directive**<sup>25</sup> and the **Sewage Sludge Directive**<sup>26</sup> do not explicitly address methane emissions. However over the past three decades the implementation of these directives has helped to prevent significant methane emissions due to the collection and treatment of wastewater in efficient centralised facilities and diverting sludge disposal from landfilling. With GHG emissions being specific to each facility and the type of treatment applied, the facilities promoted by the directive typically emit significantly less methane and other greenhouse gases than alternative treatment approaches. The Commission intends to come forward shortly with a proposal to update this Urban Waste Water Treatment Directive which will contribute to further CH<sub>4</sub> emission reductions in this sector. An important focus will be to increase biogas

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<sup>19</sup> For instance, decreases in per capita consumption of animal products for nutrition are projected to reduce CH<sub>4</sub> emissions.

<sup>20</sup> It is estimated that around 88 million tons of food waste are generated annually in the EU. See: <http://www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf>

<sup>21</sup> Directive 2008/98/EC, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0098>

<sup>23</sup> Directive (EU) 2018/850, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018L0850>

<sup>24</sup> Eurostat, env\_wasmun

<sup>25</sup> Directive 91/271/EEC, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0271>

<sup>26</sup> Directive 86/278/EEC, at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31986L0278>

capture and reduce the net energy consumption by waste water treatment plants. Overall in the waste management sector, efficient biogas recovery, including through anaerobic digestion, offers still significant mitigation potential. The announced support to bio-methane production from waste and residues in the **REPower EU plan**<sup>27</sup>, are likely to disincentive landfilling of biodegradable waste in the coming years and a better biogas recovery.

Although technically, landfills are already included in the scope of the Industrial Emissions Directive, no Best Available Technologies (BAT) definition currently exists for landfills because the current Landfill Directive was seen as covering those. Due to the technical developments and innovation that have taken place since the adoption of the above mentioned Landfill Directive in 1999, more effective techniques for protecting human health and the environment are now available. The Commission has proposed to adopt BAT conclusions for landfills under the new IED, which would allow potentially further improvement in for instance methane capture.

Waste legislation is also key in the implementation of the EU **Circular Economy Action Plans**<sup>28</sup>. Focus is shifting towards waste as a resource, maintaining resources in the economy for as long as possible. Achieving circularity will reduce the need for disposal of remaining waste streams. For waste streams that contain biomass this will reduce the potential for CH<sub>4</sub> emissions in case they would be landfilled, and for separately collected biodegradable waste streams, this will improve the circularity of nutrients and contribute to a renewable energy portfolio by recycling and energy recovery.

### Reducing CH<sub>4</sub> emissions in the energy sector

As regards energy, the European Green Deal Communication indicates that the decarbonisation of the fossil gas sector will be facilitated, including by addressing the issue of energy-related methane emissions. It also calls on the EU to engage with third countries on cross-cutting climate and environment issues, including via action to reduce methane emissions. As part of the EU's methane strategy<sup>29</sup>, the Commission has since adopted a legislative proposal to reduce CH<sub>4</sub> emissions in the energy sector. It is currently under consideration by the EU co-legislators. The proposal covers oil, gas and coal and includes:

- Compulsory measurement, reporting, and verification (MRV) for all energy-related methane emissions in the EU, building on the United Nation's Oil and Gas Methane Partnership (OGMP 2.0) methodology for the oil and gas sectors.
- Compulsory periodic leak detection and repair (LDAR) of methane leaks across all EU based oil and gas operations.
- A ban on venting and on routine flaring, restricting them to unavoidable and strictly defined circumstances.
- For coal, a ban on venting of high-concentration methane from draining stations and for ventilation shafts, limits on venting from thermal coal mines as of 2027.
- With regards to closed or abandoned assets (both wells and mines), the preparation of an inventory of those assets, measurement of emissions and the adoption of a plan to mitigate these emissions.
- As regards imports of fossil energy into the EU, an obligation on importers to provide information on methane emissions monitoring, measurement and abatement activities outside the Union with a view to establish a methane intensity profile of exporter countries and external operators. A review clause in 2025 will consider more stringent measures on fossil energy imports.
- Setting up of a methane transparency database, which will contain the methane intensity profiles of exporter countries as well as EU and external operators. These will be developed using multiple sources

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<sup>27</sup> COM(2022)108 final, at: EUR-Lex - 52022DC0108 - EN - EUR-Lex (europa.eu)

<sup>28</sup> COM(2020) 98 final (see: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A98%3AFIN>)

<sup>29</sup> COM(2020) 663 final



of information including from the importer obligation, the EU reporting requirements as well as using data from a global methane emitter monitoring tool to document high methane emitters globally.

- The aim of the methane transparency database will be to use such data in order to establish the methane intensity profile of countries and companies which would serve as a source of information for EU dialogues with partner countries, for the purchasing decisions of importers of fossil energy to the Union as well as for other stakeholders and the wider public.
- These profiles will be publically available, regularly updated and published, with a view to formulate a fact-based assessment on the level of commitment of companies and countries across the globe to reduce their methane emissions.

As part of the EU's diplomatic and external relations action, the Commission and the European External Action Service will also address methane emission reductions in all relevant sectors with partner countries and promote global coordination of efforts to address energy-sector methane emissions. In this context, the Commission supports the establishment of a detection-and-alert process for methane super-emitters using EU satellite capability, and share this information internationally through the EU funded UN International Methane Emissions Observatory (IMEO).

Next to fugitive CH<sub>4</sub> emissions associated with fossil fuel extraction, production and transportation, representing around 2/3 of total energy system CH<sub>4</sub> emissions, there are CH<sub>4</sub> emissions associated with the simple combustion of fuels. These are expected to reduce through the gradual reduction of notably fossil fuel combustion in the EU economy, during the process of transformation to a climate neutral economy.

In this context, the EU's policies related to Energy Efficiency and Renewable Energy are of importance. The Commission adopted revision proposals for both the **Energy Efficiency Directive**<sup>30</sup> and the **Renewable Energy Directive**<sup>31</sup>. Whereas current legislation foresees at least 32 % of the EU's gross final consumption of energy by 2030 coming from renewable energy, the European Commission has now proposed to increase it to 45%. Similarly, current legislation includes a headline energy efficiency target of at least 32,5% (compared to historic energy baseline projection in 2030). To cope with the impact of the current energy crisis it is now proposed to increase that to at least 39% for final energy and 41.5% for primary energy. This legislation will result in further decrease of fossil fuel extraction, production, transport and consumption, and associated reductions in fugitive CH<sub>4</sub> emissions, as well as CH<sub>4</sub> emissions from the combustion of fuels.

### Potential EU Methane emission reductions

As set out in the previous two sections, the EU has already in place a set of policies that cover all methane emissions in the EU, at economy wide level, as well as through targeted sectoral policies. Historically, the EU has managed to reduce CH<sub>4</sub> emissions steadily since 1990 (see Figure 1), reducing them by 2020 by 36%.

Existing policies as well as other trends are expected to ensure this downward continuing reducing trend. Whereas there is no explicit CH<sub>4</sub> methane reduction target, the European Commission has made projections of what is expected as potential emission reductions if all policies are fully implemented.

Its most recent 2020 Reference Scenario<sup>32</sup> incorporates all policies adopted in the fields of energy, transport, and climate until December 2019. It thus includes features such as an overall economy wide 2030 greenhouse gas reduction of 40% compared to 1990, but not the more recent increased ambition of 55% reductions. It incorporates the achievement of the 32% renewable energy target, but not the more ambitious recent target. It includes important features of waste legislation, including the 2018 amendment of the landfill directive. However, it does not incorporate newly proposed policies such as the legislation to reduce fugitive CH<sub>4</sub> emissions in the energy sector, nor an ambitious interpretation of what the implementation of the CAP

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<sup>30</sup> COM(2021) 558 final

<sup>31</sup> COM(2021) 557 final

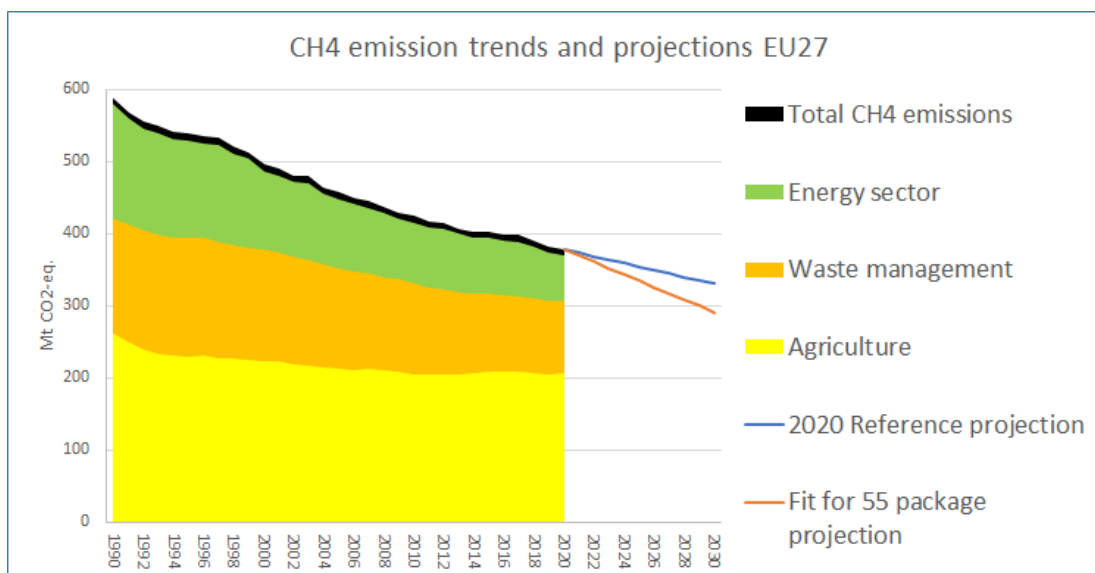
strategic plans may represent, the recently proposed review of the Industrial Emissions Directive or the forthcoming revision of the Waste Water Directive.

Overall, the Reference projection confirms that under policies as they stood in early 2020, and with their full implementation, the EU would in principle continue to reduce its CH<sub>4</sub> emissions at the same trend as in the past. Reducing emission per year by around 1.7%. This results in CH<sub>4</sub> emission reduction of around 44% by 2030 compared to 1990, or an additional emission reduction of around 12% by 2030 compared to 2020.

Under the above-mentioned policy assumptions, emission reductions would be smallest in the agriculture sector, with a small additional reduction between 2020 and 2030. Instead reductions in the energy and waste sector would remain strong, achieving already by 2030 in the Reference projection reductions that are higher than 30% compared to 2020.

In case of the energy sector, this is driven by the overall climate and energy ambition assumed in the Reference projection, i.e. to achieve economy wide 40% greenhouse gas reduction, and the achievement of the renewable energy and energy efficiency targets of respectively 32% and 32.5%. These targets are strong enough drivers to see continued reductions in fossil fuel extraction, notably in the coal sector in the EU, as well as in the transportation and combustion of such fossil fuels, resulting in the corresponding reductions in fugitive and combustion CH<sub>4</sub> emissions. For the waste sector the full implementation of the landfill directive and associated waste legislation sees emission reduction speed up in these sectors. Here full implementation of the legislation remains a key factor.

Figure 4: CH<sub>4</sub> emission trends and projections EU 27



To achieve the increased climate ambition to reduce economy wide net greenhouse gas emissions by at least 55% by 2030 will require stepping up of action, also related to CH<sub>4</sub> emissions. This includes an increased ambition in the Effort Sharing Regulation of 40% greenhouse gas emission reductions by 2030 compared to 2005, which sets ambitious national target. This should be a strong driver for Member States to take action to reduce CH<sub>4</sub> emissions.

The eventual level of CH<sub>4</sub> emission reductions will depend thus in part on the focus Member States put on CH<sub>4</sub> emissions reductions in their National Energy and Climate Plans to achieve their national greenhouse gas emission reductions targets in the Effort Sharing Regulation. Here the agriculture sector is of particular importance, representing more than 50% of total CH<sub>4</sub> emissions, in a policy domain where Member States have significant competences on how the means provided by the Common Agriculture Policy are spend.

A number of additional EU policies can contribute to achieve emission reductions beyond Reference projections. The revision of the Industrial Emissions Directive can be a driver for CH<sub>4</sub> emission reductions associated with livestock. The proposal also brings in the scope of the directive the extraction and treatment of industrial and metallic minerals, activities which have a significant impact on the environment. A benefit

of introducing the non-energy extractive sector also relates to the amounts of GHG emissions that can be regulated and potentially avoided.

The new proposed legislation in the energy sector would reduce methane emissions strongly if adopted and implemented. The impact of the current energy crisis, may see a temporary slowdown of the transformation away from solid fossils, compensated by an even higher ambition on renewable energy and energy efficiency. High prices of fossil fuels are already incentivising energy companies to reduce their methane emissions.

Finally, in the waste sector, more additional action can be taken in the waste water treatment, as captured under the upcoming proposal for the review of the Urban Waste Water Directive. Some Member States have already implemented, for instance, a landfill ban for biodegradable waste from municipal, commercial or industrial sources, to further and earlier reduce methane generated in landfills and the resulting methane emissions.

Indicative projections were made for the impact assessments that support the Fit for 55 package on what action can be taken to reduce emissions. The so-called MIX scenario in these impact assessment looks in a coherent manner at how different sectors and gases can contribute to the increased climate and energy ambition<sup>33</sup>.

The scenario projects further additional action on CH<sub>4</sub> (see figure above) resulting in an annual average rate of reduction over the decade not seen since 1990. Overall emissions would reduce by around 51% by 2030 compared to 1990, achieving an additional emission reduction of an estimated 23% by 2030 compared to 2020.

CH<sub>4</sub> emissions in agriculture would reduce, with for instance contributions from breeding through selection that enhances productivity, fertility and longevity to reduce the CH<sub>4</sub> intensity of dairy and meat products. Also increased anaerobic digestion can contribute as well as the deployment of feed additives combined with changed feed management practices. But the sector does not reduce emission by 30% in the period from 2020 to 2030.

In the medium to longer run, changes in dietary choices is another driver for reductions, as they affect the related agricultural emissions of CH<sub>4</sub> in relation to the import/export dynamics. While recognised as important in the Farm to Fork Strategy, this dynamic was not assessed in the Fit for the 55 package projection.

Additional action in the other sectors than agriculture would not be able to ensure the 30% ambition level of the Global Methane Pledge. Projections indicate that in the waste sector as well, the remaining potential, beyond full implementation of the existing legislation, is limited. Whereas emission reductions of fugitive emissions in the energy sector are still possible, with strong increased in further reductions well beyond the 30% in the period 2020 – 2030, its impact is not sufficient given the relative size of this sector in total EU CH<sub>4</sub> emissions.

As regard air quality, the Commission announced, in its Methane Strategy, that, as part of its review of the National Emission Reduction Commitments (NEC) Directive by 2025, it will explore the possible inclusion of methane among the regulated pollutants. This was already the case in the 2016 revision of the directive, but the European Parliament and the Council decided to remove the reference to methane during the adoption process. The Commission subsequently issued a declaration published at the end of the Directive, announcing its intention to further assess the impact of methane emissions on air quality, and where appropriate, submit a legislative proposal to that purpose.

## Monitoring, Reporting and Verification

The EU will continue to monitor its economy wide CH<sub>4</sub> emissions following its commitments under the UNFCCC. The EU and its Member States submit greenhouse gas inventories estimating anthropogenic greenhouse gas emissions and removals on annual basis to the UNFCCC. Methane belongs to the GHG for which reporting is mandatory. Member States estimate their GHG emissions and removals in accordance

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<sup>33</sup> See for instance the impact assessment in support of the proposal to update the Effort Sharing Regulation (SWD(2021) 611 final), section 10.4.5. on 'Scenarios for the "Fit for 55" policy analysis'.

with the 2006 IPCC guidelines, which provide for the methodologies to be used for each (sub-)category belonging to a specific activity sector. The estimation methodology or tier to be applied per (sub-)category depends on various factors including the level of emissions (key categories) and the information available. The 2006 IPCC guidelines include decision trees that help the inventory compiler navigate through the guidance and select the appropriate tiered methodology. It is good practice to use higher tier methods for key categories, unless the resource requirements to do so are prohibitive. As national circumstances may differ across Member States, the tier methods used for each (sub-)category may differ across Member States.

A strong Monitoring, Reporting and Verification is key to ensure compliance and implementation of legislation. In the waste sector no specific monitoring of methane emissions is foreseen. Despite the very positive trends since the 1990s, additional focus is placed on implementation and investment gap<sup>34</sup>. In particular, more efforts are needed on waste - including food waste - prevention.

The Convention on Long-Range Transboundary Air Pollution (LRTAP Convention), the main international framework for cooperation and measures to limit and gradually reduce and prevent air pollution, also called “Gothenburg Protocol”, is currently being reviewed. One of the major topics of this review is on the potential role of methane. This includes consideration of (a) the relevance of methane to achieving the Protocol aims and (b) what approaches might potentially be considered if methane was considered relevant. The European Union and its Member States follow closely the discussions – without pre-empting the final agreement.

To measure the impact of the Common Agriculture Policy, Member States will report annually on all the result indicators planned and every second year, the Commission will run a performance review against the milestones and targets, with potential corrective financial mechanisms. Specifically for climate result indicators include:

- Reducing emissions in the livestock sector: Share of livestock units (LU) under supported commitments to reduce emissions of greenhouse gases and/or ammonia, including manure management
- Carbon storage in soils and biomass: Share of utilised agricultural area (UAA) under supported commitments to reduce emissions or to maintain or enhance carbon storage (including permanent grassland, permanent crops with permanent green cover, agricultural land in wetland and peatland)

Other indicators are also linked to climate objectives, such on renewable energy or on landscape features.

Furthermore, evaluations and analysis will be developed, both from Commission and Member State side, assessing the contribution of the CAP Plan to the impact indicators, for example the indicator on how the CAP is contributing to climate change mitigation.

The Commission, by reflecting the Green Deal and actions proposed in climate initiatives, is promoting the mainstreaming of climate actions in the CAP through a structured dialogue with the Member States, which started with the preparation of the recommendations to MS in May 2020 on the alignment of the CAP strategic plan with the European Green Deal, including on climate objectives. This action is continuing in the current process of approval of the submitted strategic plan in 2022.

In addition, the Commission is working on initiatives which also aim to improve the estimation of methane emissions in agriculture:

- New Statistics on Agriculture
- The Farm Sustainability Data Network (announced in the Farm to Fork Strategy)
- The framework regulation on the certification of carbon removals

New MRV standards are integral to the proposed legislation on reducing methane emissions from the energy sector as explained above.

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<sup>34</sup> See the Communication from the Commission, “Environmental Implementation Review 2022 Turning the tide through environmental compliance”, COM(2022)438 final, at: [EUR-Lex - COM:2022:438:FIN - EN - EUR-Lex \(europa.eu\)](#)

## Conclusion

The European Green Deal puts the European Union on a path to climate neutrality by 2050, tackling also other environmental challenges (biodiversity loss, pollution) in a modern, resource-efficient and competitive economy that protects, conserves and enhances the EU's natural capital, and protects the health and well-being of citizens from environment-related risks and impacts. The European Climate Law enshrines this objective into legislation and sets an ambitious net greenhouse gas emissions reduction by 2030 of at least 55% compared with 1990 levels. Further reduction of methane emissions, a powerful short-lived climate forcer and a precursor of ozone which is an air pollutant, is key to deliver on the European Green Deals objectives. The European Commission has adopted an EU strategy setting out measures to cut methane emissions, notably in the energy, agriculture and waste sectors, and part of its commitment to the Global Methane Pledge, the EU will continue reducing methane emissions by 2030 and beyond.